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Gilbert Ahamer

Experiences during three generations of web based learning

Six years of web based communication

Abstract

This paper tells the story of how a set of university lectures developed during the last six years. The idea is to show how (1) content, (2) communication and (3) assessment have evolved in steps which are named "generations of web learning". The reader is offered a stepwise description of both didactic foundations of university lectures and practical implementation on a widely available web platform. The relative weight of *directive* elements has gradually decreased through the "three generations", whereas characteristics of self-responsibility and *self-guided* learning have gained in importance.

- *Content* was in early times presented and expected to be learned but in later phases expected to be constructed for examples of case studies.
- *Communication* meant in early phases to deliver assignments to the lecturer but later on to form teams, exchange standpoints and review mutually.
- *Assessment* initially consisted in marks invented and added up by the lecturer but was later enriched by peer review, mutual grading and voting procedures.

How much "added value" can *the web* provide for teaching, training and learning? Six years of experience suggest: mainly insofar as new (collaborative and self-directed) didactic scenarios are implemented!

1 History of the "three generations of web based learning"

This text discerns three phases of web based teaching / training / learning (WBT) according to how didactic targets and concepts are transposed (Bork, 2001, Prensky, 2001). During past years e-learning activities have increasingly made use of technological possibilities offered by current web platforms. In a number of cases, this enabled strive for student-centered and problem-based learning. Earlier work of the author is taken as example for defining such three "generations" (see Fig. 1).

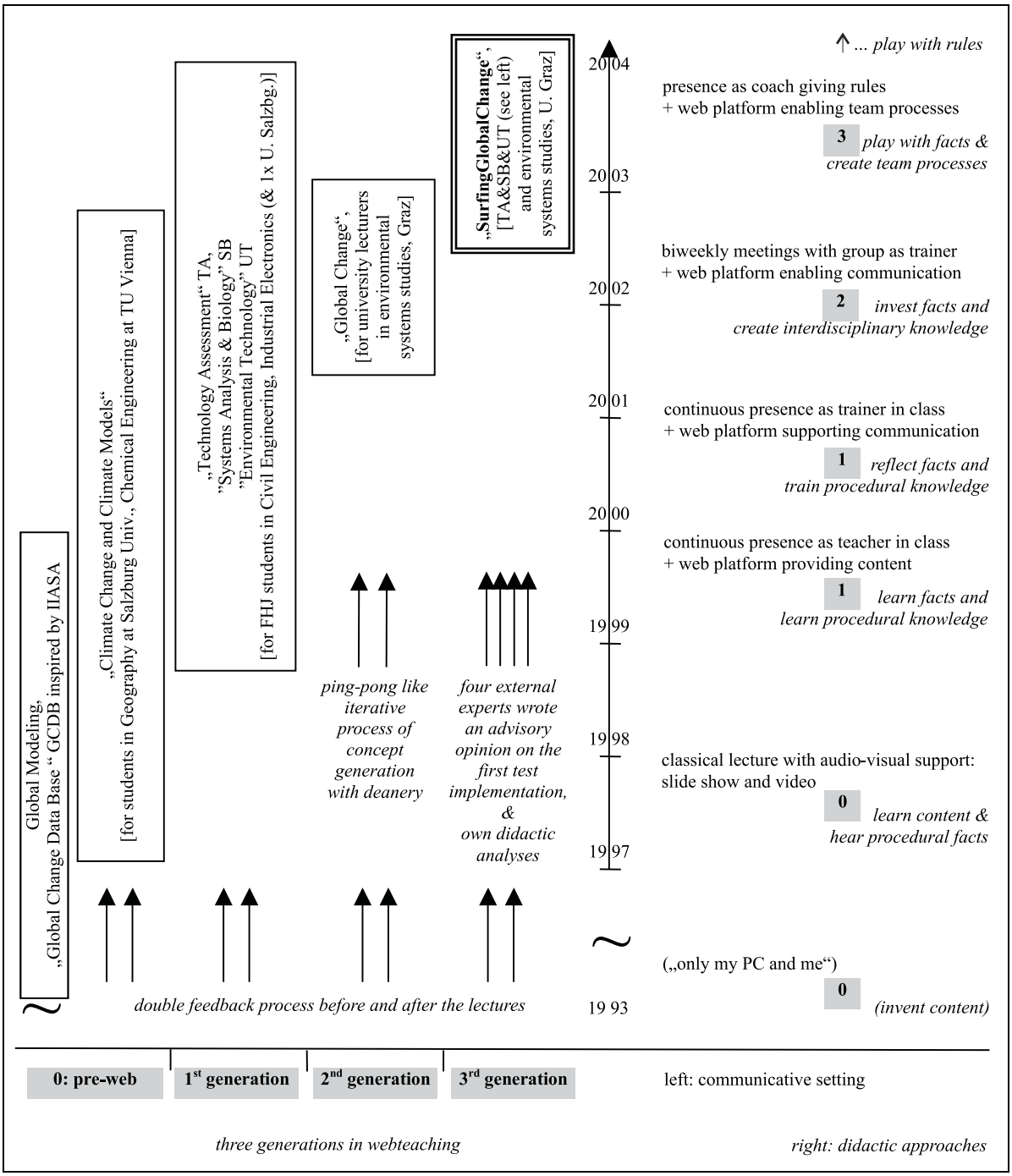

Fig. 1: History of three generations of web based learning as based on the author's earlier scientific work 1993-2004 starting from the "Global Change Data Base" GCDB. Years indicate summer semesters; generations indicate steps in implementing communicative structures; arrows denote inputs; the right hand side shows the conceptual basis (communication and didactics).

2 Three generations of web support in practical examples

2.1 First generation: content and quiz

Very often, "putting one's lecture onto the web" means in practice to provide students with written documents through internet which replaces a bunch of printed pages. Such content-centered understanding of "web based teaching" intrigues lecturers by the decrease of administrative work that is expected as a result of pasting a link to a pdf into some existing university web page. Such tactics might recall earlier epochs.

Since 1999, three *interdisciplinary* courses were held at an Austrian University of Applied Science (FH Joanneum FHJ), namely "Technology Assessment", "Systems Theory and Biology", and "Environmental Technology" (see cover pages in Fig. 2).

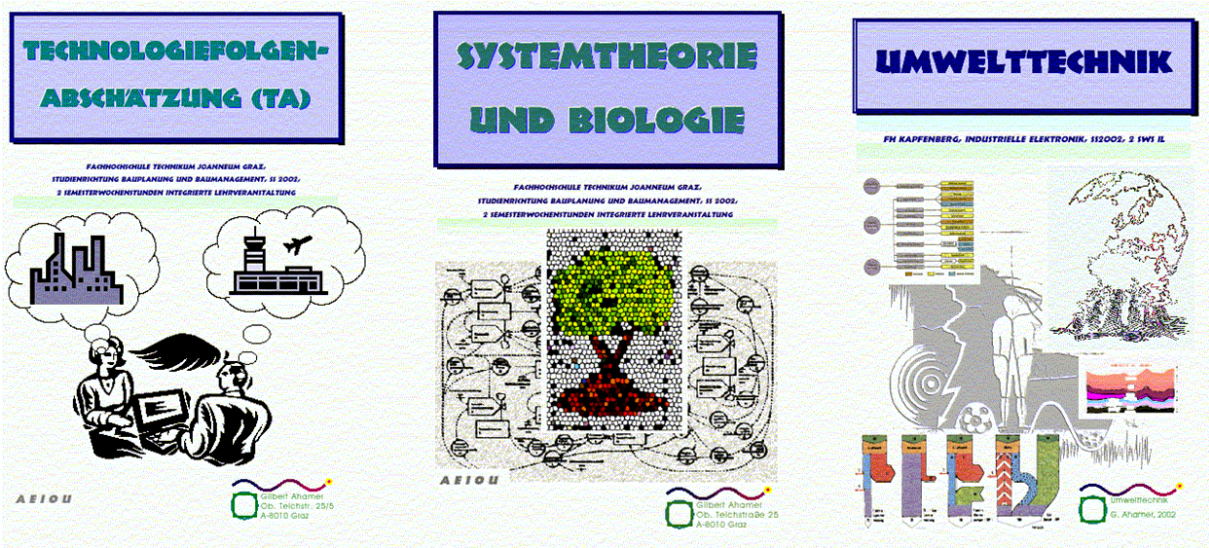

Fig. 2: 1st generation 1999: Three cover pages representing content delivered to students via both web platform and paper manuscript: "Technology Assessment" (TA), "Systems Analysis and Biology" (SB) and "Environmental Technology" (UT) at FH Joanneum through six years. Source: Ahamer (1999).

Building on the kind and helpful initial support of FHJ's Centre for Multimedia and Learning (CML) and its founder, several *functionalities* of the then newly acquired web platform Web Course Tools (WebCT, 2004) were employed in order to

- present content to students and to allow students to study independently of time and place (Lo et al., 1999)
- ask students for their specific interests and preferences at the outset of the lecture in an "initial survey"

- provide several case studies as themes for students' written assignments, allowing for differentiated personal choice in silence
- provide a discussion forum, where individual students have to deliver their resulting essays and where they receive the lecturer's critique
- require traditional results of cognitive learning (quiz equaling the written exam) and inform about exam results
- ask students for their overall feedback after the end of the courses in a "final survey",
- which is graphically represented in the left part of Fig. 5.

Content provided in the web platform was hierarchically structured into
- one list of links representing the table of contents of the course
- a set of 50 transparencies (in doc file format) used for face-to-face teaching
- a multitude of 100's text files and links covering details of all subject matters

The *final mark* for these three courses consisted of several components (Fig. 5 left) that reflect both cognitive and creative abilities of students, namely the
- individual written online exam held during lecture time in class while being controlled by the lecturer (max. 30 or 50 points for compulsory share plus max. 20 points for optional share)
- "short" case study (1 page/person) on a general theme like ethics (written and oral performance); in earlier years with oral presentation in class and in later years with directed mutual peer reviews among students via platform
- "long" case study (5 pages/team) as preparation for a role-play in class representing a negotiation of a construction project as prevalent in Environmental Impact Assessment (EIA, 1997 and EIA, 2000).

Teaching occurred face-to-face because at that early time no administrative high-level support for tele-teaching seemed realistic. Also, all three lectures had a strong component of individuals' aims, of ethical orientation that seemed to necessitate personal contact. In line with experience of the author, here web tools played best a supportive role. Later on the term "*blended learning*" was coined for such combined teaching style.

2.2 Second generation: communication and construction

After four years of such relatively simple architecture in web teaching, any interested actor would have felt notable increase in
- general awareness of didactic implications, e.g. by activities in the Austrian "Forum Neue Medien" (bm:bwk, 2000) or in single universities (NML, 2002)

- community-building among web-trainers, e.g. three informal Austrian meetings on web didactics and seminars (Gierlinger, 2002) organized by the author
- structures for professional formation (e.g. the multiple course schedules "Train-the-Trainer") organized by FH Joanneum and others (CML, 2002).

In order to push ahead the target percentage of realistically implemented "web based training", the vice-deanery at Graz University commanded a summer course to be held by the author from July to October 2002 having *three distinct targets*:
- to train university teachers to utilize the platform WebCT
- to create samples of online course material for later usage
- to train lecturers in interdisciplinary collaboration.

The course *schedule* has foreseen one face-to-face meeting every second week and online work in between (Ahamer, 2002; Ahamer and Carstensen, 2002), like a bridge with pillars (Fig. 3).

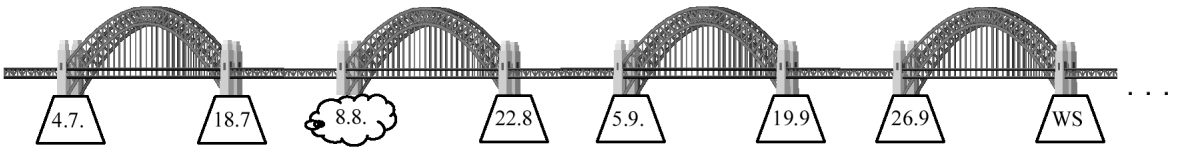

Fig. 3: 2nd generation 2002: time structure of 8 face-to-face meetings with online phases in between. Only one real meeting was replaced by a virtual one (cloud).

The architecture (Ahamer, 2002) comprised *6 phases* of ca. 2 weeks each:
- concept and media (kick-off meeting, team building and planning)
- collection of materials (creation of content pool and mutual commenting)
- didactic working-up of materials and condensing into web media (90min/team)
- trial and evaluation (mutual teaching as test, subsequent documentation)
- analysis and revision (reworking of web media, mutual commenting)
- an entire interdisciplinary course is implemented in team teaching.

How well were initial targets attained? *Evaluation* is of essential value (Barz et al., 1997; Carstensen & Reissert, 1997). A critical reflection and monitoring (Carstensen, 2002) states that 12 weeks time is too short for three ambitious targets. Encountered difficulties (like different activity level, high time consumption, decrease in motivation) are held to be typical for future own web teaching implementations by course members. In the view of the author, targets were reached according to Tab. 1.

target according to initial concept of summer course	*attainment of target after course*
usage of web platform for communication	85% ☺
authoring of concept and scenario for lecture	80% ☺
generation of module of web content	80% ☺
collaboration (independent of time and space)	80% ☺
technically mastering WebCT	75% 😐
didactic sense for implementation of web based training	75% 😐
team generation and group formation	70% 😐
interdisciplinary dialogue inside the teams	60% 😐

Tab. 1: Monitoring of the degree to which the targets of the summer course have been reached according to the personal view of the author on 18.9.2002.

The *iterative character* of the course and its successors comprises the years 2002–2005:

- the trainees of the first step (= summer course 2002) build up the structure of a web based "interdisciplinary course for Environmental Systems Sciences" (IPK-USW) in 2002/03
- this course comprising 6 weekly hours is implemented in WebCT (Ahamer et al., 2002); it demands from students to merge technological, ecologic and economic views and produces a number of written and reflected standpoints by using the game "SurfingGlobalChange"
- innovative students from this first course propose a second implementation of SGC with different case studies focussing on the EU enlargement process (Florian, 2004). Thus the web based material will be annually enlarged.

2.3 Third generation: collaboration and mutual assessment

Based on experiences described earlier, an original web based negotiation game "SurfingGlobalChange" (Fig. 4) was invented and implemented (Ahamer, 2004a).

Fig. 4: 3rd generation 2003/04: Welcome screen of SurfingGlobalChange SGC.

This role-play is inspired by the conviction that equilibrium between two major complementary groups of skills has to be reached for successful professional life, namely *competition and consensus*.

Until May 2004, SGC was implemented five times for Graz University and FH Joanneum in interdisciplinary courses for advanced semesters: Resulting social dynamics were monitored by a number of independent experts invited and financed by the author (Rauch, 2003). Moreover, a subset of the game idea of level3 was delivered as input to the EU project "UniGame"; additionally a didactically founded game concept for the Graz contribution to this project was provided (Ahamer, 2003). Furthermore, a game scenario was developed in collaboration with FHJ members (Ahamer et al., 2003), which serves as basis for a game in the meantime renamed "UniGame: Social skills and knowledge training". However, the game architecture has been significantly reduced compared with the initially delivered concept.

Detailed statistical evaluation of students' results has shown that cognitive performance (e.g. measured by marks from quizzes), skills of authoring academic articles, skills of reviewing them, and skills of discussion are to a large extent uncorrelated with each other and could be seen as independently varying. For the time being the conclusion is made that such skills have to be measured and assessed separately from each other in order to draw a complete picture of a personality.

3 Comparison of characteristics in three generations

3.1 Is there a trend in web platforms' functionalities used?

The *three main functionalities* of the web platforms, namely content, quizzes and communication are employed through the three generations, while the clear main trend is a *shift* away from the usage of content-oriented towards the usage of communication-oriented functionalities in the web platform. The sharply increasing hit frequency underlines such a view and suggests that for students a discussion forum is a tool to create public space for the members.

Digital media may serve as a *vehicle* for self-guided learning in thematically and communicatively open structures. Didactic deliberations and fundaments are largely available (Gierlinger et al., 2004; Ahamer, 2004). Web platforms are able to create *public space* as an easily accessible "home" for newly forming groups and as mentally comfortable living room for learners.

The overall trend regarding assessments consists in a *shift of roles*: initially only the lecturer has the power to grade, later on well-defined sub-portions of grading tasks are performed by peer students. Such development is well in line with a finding for another professional field, namely that for the assessment of university studies both internal and external evaluation is necessary (Reissert & Carstensen 1998).

3.2 How did assessment and grading develop?

Fig. 5 comprises the development of course units from the first to the third generation taking the described lectures as an example. It is visible that the invention of the web based negotiation game "SurfingGlobalChange" by the author equals further development of two earlier interdisciplinary web based lectures.

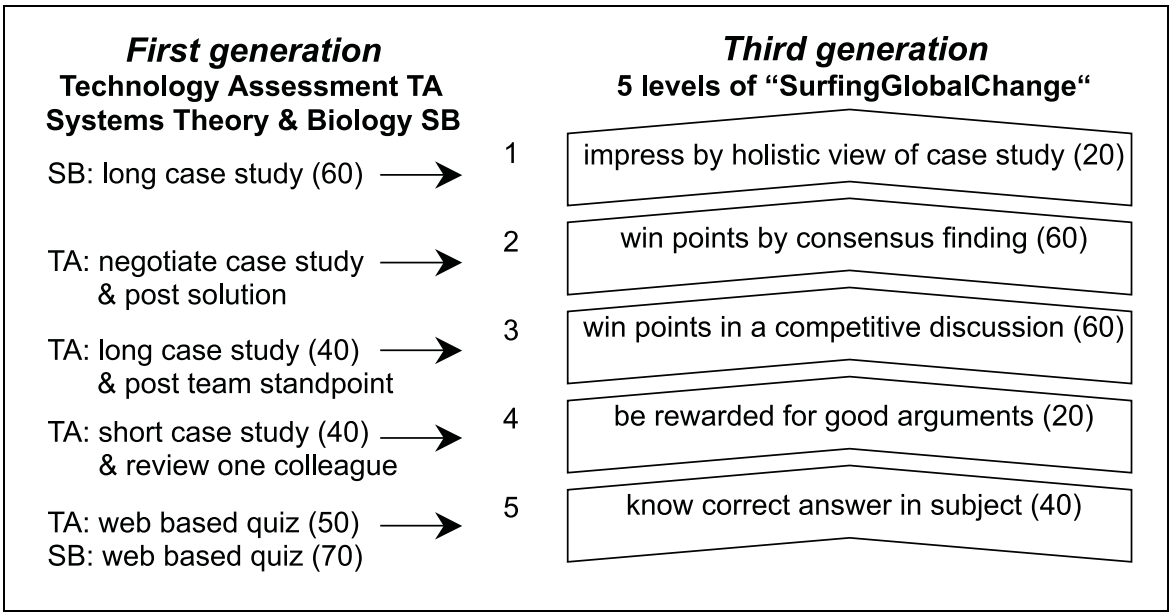

Fig. 5: Development of course components comprising 4 weekly hours from classical web teaching in the first generation (left) to SGC as third generation (right). Maximum rewards in the single levels are added in brackets.

3.3 Which didactics is decided for?

As a result of three generations of web based learning SurfingGlobalChange grounds on didactic deliberations made earlier (Ahamer, 2004) and

- builds on a tradition of simulation and gaming (Klabbers, 2001)
- relies on ethics of negotiation (e.g. Fischer-Kowalski et al., 1995)
- is inspired by constructing realities (Foerster, 2003; Kerres, 2001a)
- does not attempt to mathematically simulate complex realities (Meadows, 2001; Burns, 2002)
- but is simulative for real-life processes (Myers, 1999)
- is founded on systems thinking (Richmond, 1993; Ossimitz, 2000)
- allows pragmatic strategies (Reilly, 2003)
- and uses environmental themes as trigger for the emerging global responsibility of humanity (Rauch, 2000, 2002, 2002a).

4 Conclusions

This article has *told the story* of steady development of university courses while gradually increasing the complexity of communication and assessment structures. Guiding philosophy is web based collaborative learning in cases and constructionism.

Seen from the perspective of trainers and learners, the bundle of formerly cognition-oriented targets is enriched: (i) find learning targets yourself, (ii) form teams, (iii) give and take feedback, (iv) reflect and stepwise improve own and others' pieces of work.

Concluding from the courses described in this paper, participating students can be observed to pass on through consecutive steps as a function of novelty and appeal:

- learn facts
- play with facts according to game rules
- play with rules.

May the interesting experiences made by game based learning contribute to developing a sustainable human future!

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